

CLAIMS

1. A data prefetch method for generating a prefetch instruction for indirect reference in correspondence with a cache line when values of an indirect reference array used as indices for a program of making indirect reference to an array increase or decrease in accordance with a predetermined rule, and a rate of increase or decrease is within a predetermined range, in a compiler of a programming language for generating an instruction to a microprocessor having a prefetch instruction.

2. The data prefetch method according to claim 1, wherein increase or decrease in the values of the array of indirect reference used as said indices and the rate of increase or decrease are determined by analyzing a directive described in source code.

3. The data prefetch method according to claim 1, wherein increase or decrease in the values of the array of indirect reference used as said indices and the rate of increase or decrease are determined by analyzing an option designated to the compiler.

4. The data prefetch method according to claim 1, wherein increase or decrease in the values of the array of indirect reference used as said indices and the rate of increase or decrease are determined by analyzing an expression of defining an element of the index array.

5. The data prefetch method according to claim 1, wherein increase or decrease in the values of the array

10067247.026702

of indirect reference used as said indices and the rate of increase or decrease are determined in such a manner that source code of a loop including indirect reference is presented to the user and the user instructs a change amount of each of the indices.

6. A compiler for compiling a program executed on a computer having a prefetch instruction for transferring data from a main memory to a cache memory in parallel with execution of another instruction, comprising:

- (a) a process of translating a source program in a loop in a program into an intermediate language,
- (b) a process of recognizing a loop structure of said loop on the basis of said intermediate language obtained by the translation and generating a second intermediate language and a loop table,
- (c) a process of analyzing the loop with reference to said generated second intermediate language and loop table, recognizing indirect reference in the loop, and generating a third intermediate language, and
- (d) a process of generating a prefetch instruction on the recognized indirect reference by referring to said generated third intermediate language and loop table.

7. A recording medium storing thereon

- (a) a program for a process of translating a source program in a loop in a program into an intermediate language,

- (b) a program for a process of recognizing a loop

structure of said loop on the basis of said intermediate language obtained by the translation and generating a second intermediate language and a loop table,

10 (c) a program for a process of analyzing the loop with reference to said generated second intermediate language and loop table, recognizing indirect reference in the loop, and generating a third intermediate language, and

15 (d) a program for a process of generating a prefetch instruction on the recognized indirect reference by referring to said generated third intermediate language and loop table.